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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/066,760	02/06/2002	Yoichi Iihoshi	381AS/49702DV	8415

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EXAMINER

NGUYEN, TU MINH

ART UNIT	PAPER NUMBER
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3748

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DATE MAILED: 07/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

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**Office Action Summary**Application No.  
**10/066,760**Applicant(s)  
**Iihoshi et al.**Examiner  
**Tu M. Nguyen**Art Unit  
**3748**

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_\_.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 7-10 is/are pending in the application.
- 4a) Of the above, claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 7-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claims \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on Feb 6, 2002 is/are a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☒ All b) ☐ Some\* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/793,402.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s), \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s), 2                      6) ☐ Other:

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### **DETAILED ACTION**

1. An Applicant's Preliminary Amendment filed on February 6, 2002 to indicate the pending application to be a division of application serial no. 09/793,402, has been entered.

Claims 7-10 are pending in this application.

#### ***Drawings***

2. The drawings are objected to because
  - Figure 1, numeral 11 is not described in the specification.
  - Figure 12, the dashed line (indicating the average fuel amount over all cylinders) appears to be too low. It should at least be in the rich region for PATTERN 3.
  - Step S56 in Figure 19 and step S72 in Figure 21 are not described in the specification.Correction is required.

#### ***Specification***

3. The abstract of the disclosure is objected to because on line 7, "quicken" should read --quicken--. Correction is required. See MPEP § 608.01(b).
4. The disclosure is objected to because of the following informalities:
  - Page 4, line 14, "Co" should read --CO--.
  - Page 6, line 21, "high" should read --higher--.

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- Page 7, line 5, "high" should read --higher--. Line 18, "this" should be deleted.
  - Page 8, line 1, "complicate" should read --complicated--. Line 11, "burring" should read --burning--.
  - Page 12, line 19, "4" should read --14--.
  - Page 16, line 24, --is minimized-- should probably inserted following "converter".
  - Page 19, line 25, --if-- or --when-- should be inserted following "14B,".
  - Page 21, line 5, --of Fig. 18-- should be inserted following "embodiment".
- Appropriate correction is required.

### *Claim Objections*

5. Claims 7-10 are objected to because of the following informalities:
- Claim 7, line 2 of the claim, "a cylinder" should read --cylinder--.
  - Claims 8 and 9, line 7 of each claim, "the" should read --a--.
  - Claim 10, line 7 of the claim, "high than the" should read --higher than a--.
- Appropriate correction is required.

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***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

A person shall be entitled to a patent unless --

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

7. Claims 7-9 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirota et al. (U.S. Patent 6,199,374) (Hirota'374).

Re claim 7, as shown in Figure 1, Hirota'374 discloses an exhaust control system for a cylinder fuel injection engine having cylinder injection injectors (7) directly injecting a fuel into combustion chambers (2) and a catalytic converter (18) provided in an exhaust passage (16) from the combustion chambers for purifying an exhaust gas (SO<sub>x</sub>), wherein at least one time of auxiliary fuel injection is performed at a timing from expansion stroke to exhaust stroke after a primary injection injecting a primary fuel for obtaining an output of the engine (according to Figure 8, if an absorbed sulfate amount is greater than a threshold value (step 55 with YES answer), an auxiliary injection is performed at a timing from expansion stroke to exhaust stroke after a primary injection to yield excess rich components in the exhaust gas for the purging and reduction of absorbed sulfate in the catalytic converter).

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Re claim 8, the exhaust control system of Hirota'374 includes a catalytic converter temperature measuring means (40) for measuring a temperature of the catalytic converter for making a period of auxiliary injection longer when the temperature of the catalytic converter is lower than a predetermined value (according to Figure 7A, a rich time for auxiliary injection is longer as the temperature of the catalytic converter is lower).

Re claim 9, the exhaust control system of Hirota'374 includes a catalytic converter temperature measuring means (40) for measuring a temperature of the catalytic converter for reducing fuel amount of the auxiliary injection when the temperature of the catalytic converter is lower than a predetermined value (if the temperature of the catalytic converter is outside an optimum temperature range of sulfate reduction (OTSUL), the auxiliary injection for sulfate reduction is stopped (also see Figure 13, step 96 in Figure 18, lines 50-56 of column 10)).

8. Claims 7 and 10 are rejected under 35 U.S.C. 102(e) as being anticipated by Hirota (U.S. Patent 5,996,338) (Hirota'338).

Re claim 7, as shown in Figure 8, Hirota'338 discloses an exhaust control system for a cylinder fuel injection engine having cylinder injection injectors (9a) directly injecting a fuel into combustion chambers (4) and a catalytic converter (22) provided in an exhaust passage (20) from the combustion chambers for purifying an exhaust gas (NO<sub>x</sub>), wherein at least one time of auxiliary fuel injection is performed at a timing from expansion stroke to exhaust stroke after a primary injection injecting a primary fuel for obtaining an output of the engine (from Figure 9, if a temperature-rise flag is set to raise an exhaust gas temperature for the purging and reduction of

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stored NO<sub>x</sub> in the catalytic converter (step 80 with YES answer), an auxiliary injection is performed at a timing from expansion stroke to exhaust stroke after a primary injection).

Re claim 10, the exhaust control system of Hirota'338 includes a catalytic converter temperature measuring means (39) for measuring a temperature of the catalytic converter for retarding timing of the auxiliary injection when the temperature of the catalytic converter is higher than a predetermined value (step 80 with NO answer) (as illustrated in Figure 4, during a lean engine cycle, the temperature of the catalytic converter (TC) is maintained at LTH for optimum NO<sub>x</sub> absorbing capacity. Thus, during a lean engine cycle, if  $TC > LTH$ , the auxiliary injection timing is retarded to decrease an exhaust gas temperature).

#### *Prior Art*

9. The IDS (PTO-1449) and the Notice of References Cited (PTO-892) of the application serial no. 09/793,402 have been considered. An initialized copy of each is attached hereto.

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents.

- Rossi Sebastiano et al. (U.S. Patent 5,826,425) disclose a method to regenerate a soot filter by performing a post injection during the exhaust stroke.

- Hirota et al. (U.S. Patent 5,839,275) disclose a fuel injection device with secondary fuel injection to keep a NO<sub>x</sub> catalyst within an optimum NO<sub>x</sub> purification temperature range.

- Kaneko et al. (U.S. Patent 6,041,591) reduce a frequency of post fuel injection as the catalyst temperature is approaching a target temperature (see Figure 17C).

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- Takami et al. (U.S. Patent 6,141,960) disclose a split fuel injection to desulfurize an NO<sub>x</sub> absorbent.

- Hirota et al. (U.S. Patent 6,178,743) disclose the advancing of a secondary fuel injection timing to increase exhaust gas temperature.

*Communication*

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 308-7763.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

*Tu M. Nguyen*

TMN

Tu M. Nguyen

July 4, 2002

Patent Examiner

Art Unit 3748

*Thomas Denion*

**THOMAS DENION  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 3700**